

Presented by Team 900  
The Zebracorns



# Scouting in FRC

---

A great way for any team to do better in competition



# What is Scouting?

- Collecting and utilizing information on robots in competition.



# Why Scout?

- Scouting is a great way to gain an advantage at competition.
- Your alliances in quals and elims will be much more successful if they know what they're doing prior to getting on the field.
  - To pick your best match strategy, you have to know your enemies and allies.
- Scouting can help you get better partners in eliminations.
  - Identifies robots you want to pick and teams you want to market your robot to.

# How Teams Scout

## Before competition

- Looking for videos online featuring robots for this year, especially those attending your competitions.

## At Competition:

- Pit Scouting – going around the pits asking questions about robots
- Stand Scouting – watching each match and recording data on the competitors.

# Pit Scouting:

Teams of two go to each pit and fill out a form for each robot.

Main questions:

- What a robot “can” do.
- What the drivetrain is like.



# Stand Scouting Systems

Paper

Digital

Hybrid

# Paper Systems



- Team of 7 to 9 at a time.
- 6 “main” scouters
  - Each watches one robot and fills out a form on how the robot acts
- 1+ organizer(s) – collects data after each match and organizes it.
- Ideally 1+ “broad scouter”(s) – Doesn’t record data, just watches the field. After each match, checks each scouter’s data for errors/inconsistencies, then hands off to organizer(s).

# Paper Systems – pros / cons

- Pros – easy to take down qualitative data, very few failure points. All the data can be sorted and organized simply.
- Cons – Only one very big and heavy copy of the data. Numerical stats can't be easily generated.



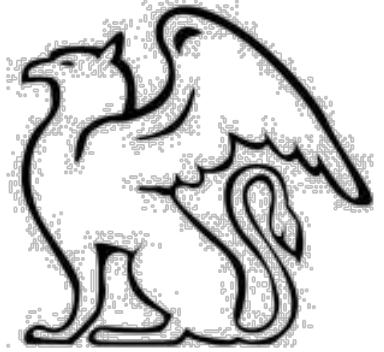
# Digital Systems



- Scouters use laptops, tablets, or phones.
  - Enter data into powerpoints, spreadsheets, or apps.
- Benefits - multiple copies of the data can easily be made, numerical stats are easy to generate, no need for an organizer, can update in real time.
- Problems with digital
  - Qualitative data can be harder to collect/analyze.
  - Getting 6 devices and keeping them charged/ connected to a network can be a pain.

# Hybrid Systems — paper + digital

- Scouters collect on paper, multiple organizers input the data into a database.
- Benefits over digital — only need 2-3 laptops rather than 6 devices. Laptops can be stationed away from stands (where outlets are accessible). Easier to transfer data between devices without a network (USBs).
- Problems
  - Requires more organizers. Backlog can be significant (3 – 4 matches per team). All organizers have to be able to read handwriting.



# Stand Scouting – what to tell scouters to avoid

In the comments: “This robot is bad.”

- That doesn’t tell me anything. What went wrong? Was it mechanical issues or poor driving?

Gehrfo sdfinkelj]

- Write legibly and clearly, *please*
- There will always be a few who are beyond saving 😞

Missing your shifts

- The best you can do to avoid this is to make sure students appreciate their roles.

# Match Strategizing

- Lead Scout goes to the team's pit with data. Talks to drive team about our enemies/allies, and recommends strategies.
- Drive team chats with allies to figure out a game plan.

# Match Strategizing – what not to do

## Bicker with allies / be inflexible

- Allies are ultimately in charge of their own robots, so if they won't listen, be graciously professional and get the most out of them you can.
- Bickering gives your team a bad reputation.
- Teams might have been working on their robot in the pits/on the practice field, and thus might be able to do something better than the data says.

## Have no contingency plan

- Things **will** go wrong. The alliance must be ready to switch it up.

# Alliance Selections

Top eight teams (ranked on win/loss) pick partners

- #1 gets first pick, #8 gets eighth pick
- #8 gets 9<sup>th</sup> pick, #1 gets 16<sup>th</sup> pick

Alliance captains can pick other captains

- In this case, 9<sup>th</sup> ranked team becomes #8 captain, #8 captain becomes #7 captain, etc.
- Can't pick captains who already have allies.

Teams can decline, but then no one else can pick them

- Alliance captains and teams who might become captains sometimes do this in hopes of creating a better alliance.

# Alliance Selections – what we do

- Make pick list the night before eliminations.
  - Sort teams by roles and then by ability.
- Lighten up on scouting next day – only 2 or 3 people in stands, only recording noteworthy events/changes in performance.
- Update list right before alliance selection.
- Lead Scouter represents team during picks.

# Alliance Selections – what not to do

Not make a list because you won't be a captain.

- MAKE A LIST. You can help out your alliance captain with picks.

Wait until the last minute to make a list

- Making a list should take hours. You will not have time the day of selections to do this.

Have only one long column of team numbers

- You need to have teams split by role so that you can pick for the roles you need.

Focus on “safe” picks

- If you are under serious threat from the other alliances, be ready to make risky picks. Pick the team you are most likely to win with, not the team you will most likely get far with.



# OPR – Offensive Power Ranking

Only uses scores of each match.

- Turns it into a matrix (team a + team b + team c = 90pts)
- Solves for each component (each team's average "contribution" to their alliances' scores).
- Has other derivatives (DPR, APR)

It's used by many teams, and is often relied upon heavily.

- Beware: A number tells you nothing concrete about what a robot does.
- It has can have significant bias

Can be useful for certain games (2013)

- That being said, real scouting should come first

# Coordinating Scouters

## Be aware of burnout

- For most students, scouting gets boring after a few hours



## How to combat burnout

- Reasonable shift lengths
- Lots of feedback / encouragement
- Snacks



# In Summary

- The main forms of scouting at competitions are stand scouting and pit scouting.
- There are many different types of scouting systems.
  - Use whatever system works for you.
- Scouting data is important for match strategizing and alliance selections.
- Make sure your scouters are appreciated and well taken care of.

# Resources

- FRC Spyder app
- ChiefDelphi – The robotics forum  
[www.ChiefDelphi.com](http://www.ChiefDelphi.com)
- FRC GameSense -- Mentors talking about strategies and upcoming regionals  
[www.youtube.com/user/FRCGameSense](http://www.youtube.com/user/FRCGameSense)
- The Blue Alliance – videos / info from past events  
[www.thebluealliance.com](http://www.thebluealliance.com)